

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-11. (canceled)

12. (currently amended) A method for operating an internal combustion engine, comprising:
providing an exhaust aftertreatment system coupled downstream of the engine, such exhaust aftertreatment system having an injector, a nonthermal plasma discharge device located downstream of the injector, a NOx storage device located downstream of the nonthermal plasma discharge device, and a NOx sensor located downstream of the NOx storage device;
determining a desired NO to NO2 conversion efficiency;
providing a quantity of fuel and a quantity of electrical energy to the nonthermal plasma discharge device based on said desired conversion efficiency and minimizing a total effective fuel consumption by the nonthermal plasma discharge device; and
The method of claim 11, further comprising: determining said total effective fuel consumption as a sum of the quantity of fuel supplied to the nonthermal plasma discharge device and an equivalent fuel consumption quantity, said equivalent fuel consumption quantity is based on an amount of electrical power supplied to the nonthermal plasma discharge device, the overall efficiency of the engine to convert fuel energy into electrical energy, and the energy content of the fuel.

13. (original) The method of claim 12 wherein said overall efficiency of the engine is determined based on engine operating conditions.

14-15. (canceled)

16. (previously amended) **A method to operate a nonthermal plasma discharge device** in converting NO to NO₂, the nonthermal plasma discharge device being a component included in an exhaust aftertreatment system coupled to an internal combustion engine, the method comprising:

supplying a quantity of fuel to said nonthermal plasma discharge device;

supplying a quantity of electrical energy to the nonthermal plasma discharge device;

basing said fuel quantity and said electrical energy quantity on minimizing a total effective fuel consumption of the nonthermal plasma discharge device wherein said total effective fuel consumption is based on a sum of said fuel quantity and an effective fuel consumption to provide said quantity of electrical energy.

17. (original) The method of claim 16 wherein said effective fuel consumption is based on the overall efficiency of the engine to convert fuel energy into electric energy and the energy content of the fuel.

18. (previously amended) The method of claim 16 wherein said exhaust aftertreatment system further comprises a NO_x storage device located downstream of the nonthermal plasma discharge device.

19-25. (canceled)

26. (original) A method for operating an exhaust aftertreatment system coupled to an internal combustion engine, comprising:
increasing a quantity of fuel supplied to the exhaust aftertreatment system when a signal from a NO_x sensor disposed proximate the exhaust aftertreatment system indicates NO_x exceeds a predetermined level of NO_x; and
increasing electrical energy to said nonthermal plasma discharge device based on

a signal from said NOx sensor, wherein said exhaust aftertreatment system comprises a nonthermal plasma discharge device located downstream of said engine, a NOx storage device located downstream of said nonthermal plasma discharge device, and a NOx sensor located downstream of said NOx storage device and
The method of claim 25 wherein said increases in said electrical energy and increases in said quantity of hydrocarbons are coordinated.

27. (original) The method of claim 26 wherein said coordination is based on minimizing a fuel economy penalty.

28. (original) The method of claim 27 wherein said coordination is further based on maintaining a NOx concentration at the NOx sensor below a predetermined NOx concentration.